

What is claimed is:

Coating composition for electrical conductors comprising

- A) 1 wt.% to 90 wt.%, based on the total weight of the binder, of one or more binders ,
- B) 0.3 wt.% to 25 wt.%, based on the total weight of the binder, of one or more reactive particles based on an element-oxygen bound network with elements selected from the group consisting of aluminium, tin, boron, germanium, gallium, lead, the transition metals, the lanthanides and actinides, and
- C) 0 wt.% to 95 wt.%, based on the total weight of the binder, of one or more conventional additives, solvents, pigments and/or fillers,

wherein the total of A) + B) +C) equal 100% and

wherein the reactive particles of component B are based on the element-oxygen network, on the surface of which reactive functions  $R_1$  and optionally, non-reactive and/or partially reactive functions  $R_2$  and  $R_3$  being bound by way of the oxygen of the network,  $R_1$  being contained in the particles in an amount up to 98 wt.%, based on the weight of the particles, and  $R_2$  and  $R_3$  being contained in the particles in an amount from 0 wt.% to 97 wt.%, based on the weight of the particles;

wherein  $R_1$  represents radicals of the metal acid esters; NCO, urethane, epoxide, epoxy, carboxylic acid anhydride, C=C double bond systems, OH, alcohols bound by way of oxygen, esters, ethers, chelating agents, COOH,  $NH_2$ ,  $NHR_4$ , and/or reactive resin components;

$R_2$  represents radicals of aromatic compounds, aliphatic compounds, fatty acid derivatives; esters and/or ethers,

$R_3$  represents resin radicals, and

$R_4$  represents radicals of acrylate, phenol, melamine, polyurethane, polyester, polyester imide, polysulfide, epoxide, polyamide,

polyvinyl formal resins; aromatic compounds, aliphatic compounds; esters; ethers, alcoholates, fats, or chelating agents.

2. The coating composition according to claim 1, containing 2 to 5 wt. % based on the total weight of the binder, of one or more reactive particles of component B.
3. The coating composition according to claim 1, wherein the radical  $R_1$  is selected from the group consisting of  $OTi(OR_4)_3$ ,  $OZr(OR_4)_3$ , acetyl acetonate, 2-hydroxyethanolate, diethylene glycolate.
4. The coating composition according to claim 1 wherein  $R_3$  is selected from the group consisting of radicals of polyester imides, THEIC polyester imides and mixtures thereof.
5. The coating composition according to claim 1 wherein  $R_4$  is selected from the group consisting of radicals of acrylate resins, aminotriethanolate, acetyl acetonate, polyurethane resins, butyl diglycolate and any mixtures thereof.
6. The coating composition according to claim 1 wherein the reactive particles of component B contains a network of elements bound by oxygen selected from the group consisting titanium, aluminium, silicon, zirconium and any mixtures thereof.
7. The coating composition according to claim 6 wherein the reactive particles of component B have an average radius from 2 nm to 150 nm.
8. The coating composition according to claims 1 to 7, wherein the compositions contain up to 7 wt.%, based on the total weight of the binder, of additional monomeric and/or polymeric element-organic compounds selected from the group consisting of orthotitanic acid ester, orthozirconic acid ester, titanium tetralactate, hafnium

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tetrabutoxide, tetraethyl silicate, silicone resins and any mixtures thereof.

- 5 9. A process for coating a metal conductor which comprises applying the coating composition of claim 1 to a metal conductor and curing the composition.
- 10 10. The process according to claim 9, wherein an electrically conductive wire is used as the metal conductor.
11. The process according to claim 9 wherein the metal conductor is a pre-coated electrical conductor.
- 15 12. A process for coating a metal conductor which comprises applying the coating composition of claim 1 to a metal conductor and curing the composition; wherein the coating composition is applied as a single layer, as a base coat, as a middle coat and/or as a top coat to the metal conductor.
- 20 13. A metal conductor coated with the cured coating composition of claim 1.
- 25 14. A process for removing a selected portion of the coating from a coated metal conductor of claim 13 which comprises irradiating a selected portion of the coating of the coated metal conductor with laser irradiation in the range of medium to high energy thereby vaporizing the selected portion of the coating without leaving a residue of the coating on the metal conductor.

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